

LAWRENCE LIVERMORE NATIONAL LABORATORY

SITE PROFILE

December 1999

**Office of Oversight
Environment, Safety and Health
U.S. Department of Energy**

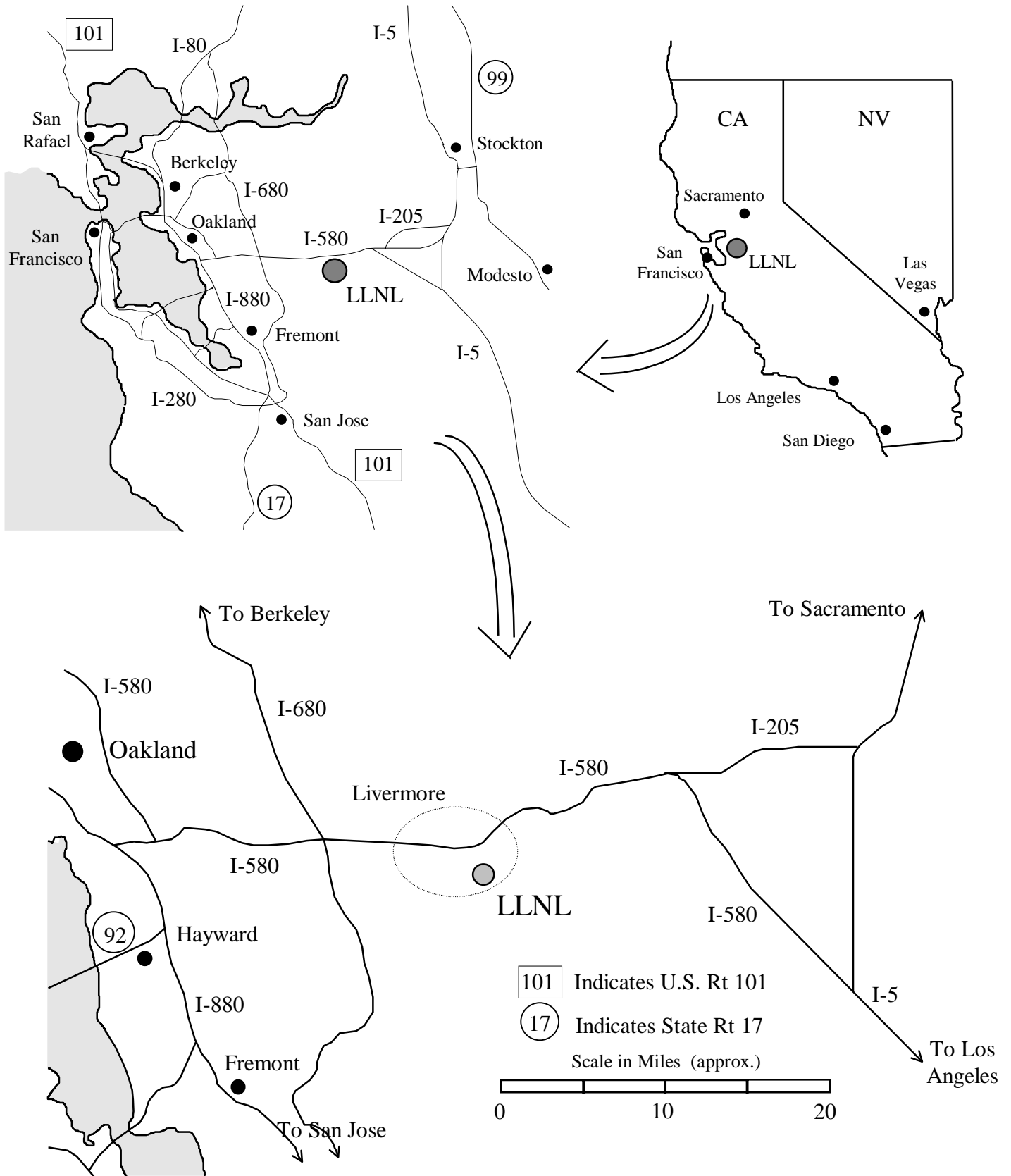
TABLE OF CONTENTS

	Page
BACKGROUND.....	1
MAJOR ENVIRONMENT, SAFETY, AND HEALTH INITIATIVES/ACTIVITIES	5
ENVIRONMENT, SAFETY, AND HEALTH ITEMS FOR MANAGEMENT ATTENTION ...	6
RECENT SITE PERFORMANCE	9
APPENDIX A: KEY FACILITY SUMMARY	11

Site profiles provide information on Department of Energy sites, including background; characteristics; major environment, safety, and health initiatives and activities; items for management attention, and performance.

The electronic version of this site profile and other Office of Oversight documents referenced in this document can be accessed from our website at **<http://www.tis.eh.doe.gov/oversight/bookcase2.html>**.

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Lawrence Livermore National Laboratory Site Map

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LAWRENCE LIVERMORE NATIONAL LABORATORY

BACKGROUND

Description

The Lawrence Livermore National Laboratory (LLNL) has two major sites, the LLNL main site and Site 300. The LLNL main site, located approximately 40 miles east of San Francisco in Livermore, California, encompasses 821 acres (1.3 square miles). Site 300 occupies approximately 7,000 acres (11 square miles), and is about 15 miles east of the LLNL main site.

Established in 1952, the LLNL main site has about 600 buildings, including eight non-reactor nuclear facilities. The site's key facilities include buildings and complexes used for research, development, and test activities associated with nuclear design aspects of the nuclear weapons life cycle and related national security tasks; shipping, receiving, inspection, packaging, and storage of controlled materials; research, development, and testing of high explosives; radiography, chemistry, physics, and material science research; and general research and machining.

The site's key facilities also include buildings and complexes for the treatment, storage, and offsite shipping of radioactive, hazardous, and mixed wastes. Site 300 includes firing and test areas, chemistry and process areas, and general administration and support areas. The site's key facilities include buildings and complexes used for: high explosive safety and performance testing; energetic material and component processing; and shipping, receiving, and storage of high explosives.

LLNL is on the Comprehensive Environmental Response, Compensation and Liability Act

(CERCLA) National Priority List (NPL) for cleanup. The LLNL main site was placed on the NPL on July 1987 and Site 300 in August 1990.

The site's key facilities are described in Appendix A. Each facility's description includes its mission/status, hazard classification/authorization basis, worst case design basis accident, and principal hazards and vulnerabilities. For the purpose of the profile, a key facility is a facility, building, or complex that is significant from an environment, safety, or health perspective.

Mission

The site's mission is research, development, and safety assurance and reliability of nuclear weapons design, and research and development in many other areas. These areas include strategic defense; basic energy sciences; biomedicine; biological, ecological, and atmospheric sciences; and science education.

The mission of Site 300 is high explosives testing to support nuclear weapons development; research, development and testing for conventional weapons; and research in other areas, such as lasers and electromagnetic wave behavior.

Management

The Office of the Assistant Secretary for Defense Programs (DP) is the lead program secretarial office. The Office of Science (SC), the Office of Environmental Management (EM), the Office of Nonproliferation and National Security (NN), and the Office of Nuclear Energy, Science and Technology (NE) also fund programs at LLNL. Table 1 lists the principal Headquarters offices and their responsibilities.

Table 1. Principal Headquarters Program Office Responsibilities for LLNL

Principal Program Office		Responsibilities
Office of the Assistant Secretary for Defense Programs (DP)		Lead program secretarial office
Deputy Assistant Secretary for Research and Development (DP-10)		Research, development, testing facilities, and stockpile stewardship
Assistant Secretary for Environmental Management (EM)	Office of Waste Management (EM-30)	Waste management and technology development
	Office of Environmental Restoration (EM-40)	Identification, assessment, and cleanup activities at contaminated sites
Office of Science (SC)	High Energy and Nuclear Physics (SC-20)	Research and development in high energy and nuclear physics
Office of Nonproliferation and National Security (NN)		Arms control and nonproliferation, security affairs, and emergency management
Office of Nuclear Energy, Science and Technology (NE)		Nuclear science and technology

On October 1, 1997, a new contract took effect for the University of California's (UC) management of Los Alamos, Lawrence Berkeley, and Lawrence Livermore National Laboratories, including provisions meant to assure more financial accountability for the university; improve standards for environment, safety, and health (ES&H); and increase community involvement with the laboratories. The new contracts retain UC as the laboratories' operator until the year 2002. UC has run LLNL since its start in 1952.

The UC contract for LLNL has incorporated performance-based measures since 1992. The new contract embodies the objectives of the contract reform initiative, including an enhanced

focus on translating ES&H expectations into performance measures, as well as goals and provisions related to implementation of the DOE integrated safety management initiative.

The DOE Oakland Operations Office (OAK) manages the LLNL contract. As of September 1999, about 116 OAK employees are at LLNL.

As of April 1999, LLNL has approximately 6,400 employees. About 37 percent of LLNL employees are scientists or engineers, 25 percent are managers or administrators, 27 percent are technicians, and 11 percent are crafts personnel. In addition, about 2,300 subcontractor personnel work at LLNL. The major LLNL subcontractors are shown in Table 2.

Table 2. Major Subcontractors at LLNL

Subcontractor	Responsibility
Comforce (formerly RRA) Inc.	Plant engineering (drafters, designers, etc.)
Jobs Plus RRA, Inc.	Technicians/warehouse; miscellaneous administrative support, engineering support
Allied Signal	Facility agreement/technical support
California Management Group	Computer scientists
EDP	Computer scientists
Volt	Engineers, designers
Onsite Engineering	Engineers, designers
AID Employment	Handicapped employment services
Waltrip & Associate (Previously, Johnson Controls had this contract.)	Plant maintenance (crafts), administration support (technical writers)
E2 Consultants Eng.	Scientists
ADC	Security escorts
Entor	Short term (various categories)
GSE (Previously, Stone & Webster had this contract.)	Minor construction services

Budget

The information appearing in this section has been gathered from a number of sources and represents the best available budget information at the time of profile publication. This information is dynamic, depending on the point in the budget cycle at which it is obtained. It is included to provide the reader with a sense of

the magnitude and sources of the budget for this site. It is not intended to be the definitive source of budget information.

The LLNL budget provided by DOE for fiscal year (FY) 1999 and the FY 2000 request are about \$1.090 billion and \$1.113 billion, respectively. The summary of LLNL funding is shown in Table 3.

Table 3. Major DOE Program Funding (In Thousands)

Organization	FY 1999 Adjusted	FY 2000 Requested
Office of Defense Programs (DP)	\$815,590	\$852,081
Office of Nonproliferation and National Security (NN)	89,772	95,182
Office of Science (SC)	57,635	46,120
Office of Environmental Management (EM)	52,754	49,891
Office of Fissile Materials Disposition (MD)	30,760	25,466
Office of Civilian Radioactive Waste (RW)	22,834	22,057
Office of Nuclear Energy, Science and Technology (NE)	5,615	7,400
Office of Energy Efficiency and Renewable Energy (EE)	5,425	5,688
Office of the Chief Financial Officer (CR)	3,410	3,184
Other Activities	6,470	6,513
Total	\$1,090,265	\$1,113,582

Significant Commitments to StakeholdersCommunity Working Group to Address Site Cleanup

Complying with environmental laws, conducting routine monitoring/sampling (i.e., surface water, groundwater, air), reporting, and implementing requirements stipulated in environmental permits and agreements entered into by and/or between LLNL, DOE, the Environmental Protection Agency (EPA), and the state comprise the activities with major stakeholder interest. To facilitate this process, LLNL has established the Community Working Group (CWG) to specifically address site cleanup progress.

The Ground Water Project and the Site 300 Restoration Project

Under the jurisdiction of the CERCLA/Superfund Amendment and Reauthorization Act (SARA), Title 1, are two principal LLNL activities with significant ongoing stakeholder commitments: the Ground Water Project and the Site 300 Environmental Restoration Project. The Ground Water Project encompasses the Livermore site and Site 300, with specific provisions of the cleanup conducted according to a CERCLA Federal Facility Agreement (FFA) entered into by the EPA, DOE, the California EPA's Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (RWQCB). The Site 300 environmental restoration activities are conducted under the joint oversight of the EPA, Central Valley RWQCB, and DTSC and the authority of the FFA for the site (separate agreements are in place for Site 300 and the Livermore site). In November 1996, an addendum containing updated scope and milestone commitments was added to the FFA following approval by the regulatory agencies.

The Emergency Planning and Community Right-to-Know Act

Under Title III of SARA of 1986, or the Emergency Planning and Community Right-to-Know Act (EPCRA), LLNL maintains a comprehensive inventory of hazardous chemicals used on site and reports information on the release, storage, and use of these hazardous chemicals to organizations responsible for emergency response planning (i.e., State Emergency Response Commission, Chemical Emergency Planning and Response Commission, and Local Emergency Planning Committee).

Site Treatment Plan

As part of the Federal Facility Compliance Act, the DOE has negotiated with DTSC terms of a Site Treatment Plan (STP) for management of mixed waste at LLNL. After DTSC assessed the potential environmental impacts associated with this action under the requirements of the California Environmental Quality Act and received public comment on the proposed STP, a final STP was approved and issued in February 1997.

National Federal Facility Compliance Agreement

In compliance with the Toxic Substances Control Act, DOE, EPA, and the U.S. Naval Nuclear Propulsion Program signed, in August 1996, a National Federal Facility Compliance Agreement to address the storage and treatment of radiological waste containing polychlorinated biphenyls (PCBs). To comply with this agreement, DOE submits annual reports to EPA on the status of this waste.

Defense Nuclear Facilities Safety Board (DNFSB) Recommendations

No DNFSB recommendations apply specifically to LLNL.

MAJOR ENVIRONMENT, SAFETY, AND HEALTH INITIATIVES/ ACTIVITIES

Integrated Safety Management Implementation Status

In December 1998, LLNL submitted the integrated safety management system (ISMS) description required by DOE contract to OAK for DOE review and approval. OAK reviewed the document and provided comments to LLNL. LLNL has revised their system description and has submitted it to OAK for approval.

The Phase I and Phase II verifications of integrated safety management (ISM) of the Superblock facilities (i.e. the facilities of interest to the DNFSB) were completed on September 30, 1999. LLNL plans to complete Phase I of ISM implementation for the rest of the site by winter 1999 and Phase II by May 2000. Phase I is to verify the site's documentation of the ISMS and implementation procedures. Phase II is to verify the site's ISM implementation practices.

New Explosive Waste Treatment Facility

The readiness assessment for the New Explosive Waste Treatment Facility (EWTF) was issued on March 3, 1999. The new EWTF is now operating. The new EWTF is designed to dispose of explosives by using open detonation as well as open burning. The new facility is expected to increase LLNL's efficiency in treating explosive wastes while generating fewer harmful emissions.

Contained Firing Facility

The Contained Firing Facility (CFF) is a firing chamber planned for construction on the existing firing table at B-801 at Site 300. After construction of the CFF, the open-air detonation experiments that are currently performed on the firing table will take place inside the new firing chamber. The purpose of the CFF is to contain any hazardous and radiological materials expelled during the experiments and to provide

more stable environmental parameters for conducting the experiments. Construction is scheduled to begin in April 1999 and to be completed in 2001.

National Ignition Facility

Under the DOE's stockpile stewardship and management program, the National Ignition Facility (NIF), a \$1.2 billion project, will provide experimental data on conditions of matter similar to those occurring during nuclear weapons detonations. The LLNL site was selected following issuance of the Record of Decision for the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM-PEIS) in December 1996, and construction started in March 1997 after the Acting Secretary of Energy made Critical Decision 3. In anticipation of a comprehensive test ban, the NIF will provide an important capability for weapons-effects simulation. As a secondary objective specified by the National Energy Strategy, the NIF will advance our understanding of inertial confinement fusion and help assess its potential as an energy source. Initial operation of the first bundle of eight laser beams, which is more powerful than the Nova Laser, is scheduled for September 2001. Construction is scheduled to be completed in April 2003.

The NIF and other elements of the stockpile stewardship program (SSP) had been challenged in a lawsuit brought by the Natural Resources Defense Council and other groups. The plaintiffs claimed that the Programmatic Environmental Impact Statement (PEIS) for the SSP failed to analyze planned experiments with various materials, including plutonium, and that DOE should develop a supplement to the PEIS to take those into account. In an order issued on August 19, 1998, the court dismissed the plaintiffs' case and allowed work on the NIF to continue. Pursuant to the court's order, no later than January 1, 2001, DOE will either determine that the experiments using plutonium and certain other materials will not be conducted in the NIF, or prepare a Supplemental SSM PEIS analyzing

the reasonably foreseeable environmental impact of such experiments.

ENVIRONMENT, SAFETY, AND HEALTH ITEMS FOR MANAGEMENT ATTENTION

This section identifies topics of concern to the Office of Oversight related to LLNL ES&H programs and their implementation. The ES&H items for management attention in the June 1999 (as well as the current) edition of this site profile were identified during evaluations and reviews by the Office of Oversight. These evaluations include the November 1997 integrated safety management evaluation (ISME) and April 1998 follow-up evaluation of the previously identified weaknesses in emergency management systems at LLNL.

All items for management attention in this site profile are listed as issues in the DOE Corrective Action Tracking System (CATS). The status of issues listed in the CATS will be tracked in accordance with the recently approved DOE implementation plan for DNFSB Recommendation 98-1. Information on the corrective actions planned by line management is also available in the CATS. This information includes description of the corrective actions, deliverables, planned completion date, and status of deliverables. The CATS may be accessed through the Internet at: <http://tis.eh.doe.gov/portal/catsentry.html>.

On May 26, 1999, the director of the safety management implementation team provided guidance for preparing corrective action plans (CAPs) for the issues in the CATS, recommending that the CAP for each safety issue should have six distinct attributes. On July 29, 1999, OAK submitted the CAP for the legacy issues. The Office of Oversight reviewed the CAP and forwarded results of the review to OAK on September 13, 1999. This review indicated that the CAP does not clearly address each of the attributes specified in the guidance. The CAP is being revised, and the Office of Oversight will

complete the review after formally receiving the revised CAP.

OAK Assessment Programs

OAK assessments of contractor ES&H performance have not been effective in providing timely feedback on deficiencies, evaluation of causes, and verification of the effectiveness of corrective actions. Given the weaknesses in the LLNL self-assessment program and safety performance concerns, continued and additional OAK monitoring and appraisal are warranted—beyond day-to-day operational awareness and the annual two-week appraisals.

Action Status

The CAP is being revised. The Office of Oversight will complete the review after formally receiving the revised CAP. Meanwhile, OAK has taken a number of actions to improve their assessment program, including:

- OAK has restructured the DOE organization at LLNL to emphasize site operations, to facilitate teamwork, and to increase the efficiency of their oversight of LLNL.
- OAK has started to utilize facility operations teams to ensure that ES&H needs are identified and addressed by implementing appropriate controls early in work planning and throughout the performance of tasks.
- OAK is implementing a formal, integrated system for promoting operational awareness, using a risk-based approach incorporating ISM.
- OAK is continuing to work with LLNL on improving its self-assessment programs.

LLNL Assessment Programs

LLNL assessment programs are ineffective and need strengthening. The effectiveness of the LLNL programmatic and management assessment programs is limited by the current assessment focus, failure to identify and correct root causes, and a lack of analysis and trending of ES&H deficiencies. LLNL assessments

generally focus on material conditions and compliance and do not adequately focus on work performance. Corrective actions for identified deficiencies often do not extend beyond correction of specific citations of non-compliance, instead of identifying and correcting the root causes. With the exception of a few performance measures and indicators, there is little analysis and trending of ES&H deficiencies.

Action Status

LLNL has revised the health and safety supplement of the safety manual for the self-assessment program. This revision was completed in December 1998, and a new assessment program is scheduled to be implemented by June 30, 2000. The revised supplement will contain requirements for root cause analysis, trending of management and ES&H deficiencies, and an ISM assessment guide.

Performance Metrics

Some of the performance measures in the UC contract are vague and insufficiently challenging. The UC contract that became effective in October 1997 contains some performance metrics in Appendix F that are vague, and some of the related gradients (rating system) are not sufficiently challenging to achieve continuous improvement in LLNL safety performance. For the criterion of hazard analysis, LLNL “meets expectations” if 70 percent of the hazards are correctly identified and effective controls are in place, and it “exceeds expectations” if a gradient of 80 percent is achieved. Additionally, recent contractual evaluations have been primarily based on the performance criteria and have not factored in other performance indicators, such as events, near misses, and concerns identified by the assessment programs.

Action Status

OAK has modified the existing performance measures in Appendix F of the UC contract so

that they are clearer and more challenging. These changes include more challenging gradients for the directorate self-assessments, the radiation dose to workers, and the radiation dose to the public. OAK did not, however, revise the gradient for the hazard analysis since that metric was deleted from the contract and was replaced with an ISMS implementation performance metric. The Office of Oversight will review all these changes.

Policy and Leadership

Management’s expectations for enhancing safety management have not been effectively incorporated into LLNL policy implementation documents. Senior management’s expectations for enhancing safety management have not been effectively incorporated into LLNL policy implementation documents and mechanisms. Consequently, these expectations have not been integrated into mission activities, work planning, and hazard controls. LLNL management has not yet provided the strong leadership necessary to ensure that lower-tier managers, supervisors, and workers accept the need for a culture change, understand safety management principles, and are provided specific expectations and direction for achieving the needed improvements.

Action Status

The LLNL CAP includes a commitment to develop new policies (now in draft) covering accountability for policy implementation by summer 1999. However, the CAP is being revised. The Office of Oversight will complete the review after formally receiving the revised CAP.

Work Planning and Hazard Control

LLNL does not have an effective sitewide work planning and hazard control process. Such a process or mechanism would encompass all site activities and would effectively apply the core functions of ISM appropriate to the level of hazard. Although some work activities are well defined and hazards are adequately controlled,

other activities are not effectively controlled, and mechanisms are not established to consistently ensure that work activities, such as maintenance, temporary modifications, and support service, are controlled effectively and are appropriately tailored to the hazards. In many cases, excessive reliance is placed on researcher/worker knowledge and "skill of the craft" to define the scope of work, analyze and control hazards, and work within those controls. LLNL continues to experience events, accidents, and near misses related to the inadequate control of work activities and hazards.

Action Status

The Laboratory Director established a Safety Improvement Task Force (SITF) and required each directorate to evaluate ongoing work against ISM principles and functions to determine needed corrections. This activity was completed July 1, 1998. Each directorate has taken action to address any significant ES&H deficiencies, including work planning and hazard control deficiencies, found during this evaluation.

In December 1998, LLNL submitted the ISMS description required by DOE contract to OAK for DOE review and approval. OAK reviewed the document and provided comments to LLNL; disposition of these comments is under way. LLNL plans to complete Phase I of ISM implementation by winter 1999 and Phase II by May 2000. In addition, all Associate Directors are developing their ISMS implementation plans in accordance with the sitewide system description.

Subcontractor Safety Management

Contractual ES&H requirements are inadequate, and line management oversight is ineffective for many small subcontracts. Large construction contracts are subject to pre-qualification based on the subcontractor's safety record, and the large contracts incorporate ES&H safety plans commensurate with the level of risks involved in the project. Subcontractor performance is managed, and adequate oversight is employed in subcontracting major projects such as NIF. Subcontractor safety management

and subcontracting improvements made for large contracts have not yet been implemented for smaller subcontracts. There is a question of ownership and responsibility for oversight for smaller subcontracts let by facilities and for support services work where the level of ES&H matrix support is much less than that afforded larger projects.

Action Status

LLNL has a new system in place to assure the flowdown of ES&H requirements to onsite subcontractors. The LLNL Procurement and Material Department is incorporating ES&H clauses and appropriate safety standards into LLNL contractual documents. These clauses define contractor and contractor employee responsibilities and express LLNL's intention to assess subcontractors' ES&H performance and hold subcontractors accountable for their performance. An activity classification matrix has been developed, categorizing the various activities performed under subcontracts on LLNL sites to assist the responsible subcontract administrator in assigning safety clauses. Onsite subcontracting activities that have been categorized as "high risk" are reviewed by Hazard Control to ensure that appropriate ES&H clauses are included in the contract and that the vendors provide LLNL with site-specific safety plans when necessary.

Emergency Management

The LLNL emergency management system needs strengthening. The hazard analyses that support the LLNL emergency management program, including methodology, scope, and documentation, are not rigorous enough to ensure that the Laboratory can respond to the full spectrum of potential operational emergencies. LLNL has not established formal work processes, methodologies, or procedures to govern the conduct of these analyses. Sitewide processes are not formally linked to facility source documents, such as safety analysis reports and process hazard analyses. The Emergency Plan Implementing Procedures are outdated and inconsistent with existing requirements and site

conditions, some procedures are not sufficiently detailed to ensure that emergency managers can perform time-sensitive response to off-normal events, and some procedures have not been reviewed and approved by DOE, as required.

Action Status

The LLNL emergency management program is being comprehensively redesigned in response to Departmental initiatives and the Office of Oversight safety management evaluation. The redesign of the emergency management program, scheduled for completion by end of 1999, is part of the larger effort of implementing integrated safety management. Meanwhile, LLNL has completed the hazard analyses. In addition, the Emergency Plan Implementing Procedures were revised by LLNL and approved by OAK in November 1999.

Issues Deleted From the Previous Site Profile

Plutonium Vulnerabilities

Workers are at risk of exposure to plutonium left at LLNL from previous nuclear weapons programs. Based on the actions taken by LLNL and OAK, this issue will no longer be tracked in the site profile.

RECENT SITE PERFORMANCE

Major Events

None.

Results of Major Recent Assessments

None.

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Appendix A. Key Facility Summary

FACILITY NAME	MISSION/ STATUS	HAZARD CLASSIFICATION/ AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPAL HAZARDS AND VULNERABILITIES
Chemistry Facility Building 132 N	Mission: Chemical research and analysis Status: Operational	Safety analysis document (LLNL/OAK nomenclature for low hazard facility) for building 132 N was completed May 1996	Preliminary hazard analysis pending.	Construction activity vulnerabilities: Worker exposure to construction hazards.
Building 166	Mission: Non-nuclear general research Status: Operational	Facility Category: General Industry Preliminary safety assessment, January 1998	Release of arsine gas.	Toxic gas; acid baths; chemicals; lasers; radioactive elements; industrial. Heavy metals in the glovebox and hazardous chemicals used in semiconductor development.
Superblock Buildings 331, 332, and 334.	Mission: Bldg. 331, tritium removal; Bldg. 332, plutonium processing; Bldg. 334, nuclear weapon component test Status: All operational	331-Facility Category 3; Safety analysis report (SAR) approved 1993; a new SAR is under review by OAK 332-Facility Category 2; SAR approved by OAK 1995 334- Facility Category 3; SAR approved by OAK May 5, 1998	331 - Gas release from earthquake. Approximately 4 mrem committed effective dose equivalent (CEDE) at site boundary. 332 - Waste drum puncture and fire. Approximately 4.6 rem CEDE maximum offsite dose. 334 - Breach of container and slow oxidation. Approximately 0.45 mrem CEDE at the site boundary.	External radiation exposure; contamination, inhalation, and ingestion; potential criticality; industrial; potential plutonium release; use of chlorine and hydrochloric acid.
Superblock Support Facilities	Mission: Shipping, receiving, inspecting, packaging and storing controlled materials, and radiography Status: Operational	Facility Category 3 SAR for 231, 232 approved SAR for 233, excluding container storage, approved	Earthquake results in radioactive material release.	Plutonium; other radioactive elements; chemical; electrical; general industrial; toxic materials; and hydrogen.

Appendix A. Key Facility Summary (cont'd)

FACILITY NAME	MISSION/ STATUS	HAZARD CLASSIFICATION/ AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPAL HAZARDS AND VULNERABILITIES
321 Complex	Mission: General machining Status: Operational.	Facility Classification: Moderate; preliminary hazard assessment (PHA)	Fire resulting in beryllium release. Site boundary concentrations less than emergency response planning guidance.	Industrial; electrical; cleaning solvents; depleted uranium and beryllium; Class 4 lasers; radiation; and chemical solvents.
Chemistry and Materials Science Facilities	Mission: Chemical, isotopic, and material research Status: Bldgs. 151, 235, and 241 are operational <i>Bldg. 222 is vacant.</i>	Facility Classification: Low	Chemical/gas release within the laboratory results in injury to the researcher.	Chemicals; radioactive isotopes; high pressure; electricity; industrial; sulfur hexafluoride gas; high voltage; photochemicals; high temperatures.
High Explosives Applications Facilities Building 191	Mission: Non-nuclear explosives research and development. Status: Operational	Facility Category: Explosive; SAR approved in 1990, and revised SAR 1996. DOE approved July 1996.	Detonation in 10 kg handling area results in fatalities to people in the work room.	Explosives, industrial, and chemical. Multiple activities with explosives (handling, storage, testing) in a laboratory facility.
U-AVLIS	Mission: Uranium enrichment Status: is shutdown as of September 30, 1999. A D&D plan is under development. The work was funded and directed by US Enrichment Corporation but the facility remains owned by DOE.	Facility Category 3 Basis for interim operation (BIO) for safety authorization approved by OAK	Fire resulting in dispersal of uranium in Building 493 results in 12 mrem CEDE to workers on the site and 7 mrem to a person at the site boundary.	Radiological, electrical, laser, and industrial. Worker exposure to radiological or industrial hazards.
Site 300, New Explosive Waste Treatment Facility	Mission: Explosives waste treatment Status: Operational	Explosive SAR approved 2/2/1999	Detonation of 350 lbs explosives resulting in three fatalities.	Potential for detonation of explosives.
Waste Management Facilities	Mission: Waste treatment and management Status: B233 canopy, 514 Area, 612 Complex, and Building 693 are operational	Facility Category 3 nuclear facility SAR approved July 1996 Revised SAR submitted to OAK in September 1998	Earthquake causes building to collapse; beam falling on drum spreads plutonium and americium.	Radioactive, carcinogenic, corrosive, flammable, toxic, pyrophoric, and reactive materials that can present physical and health hazards; motor vehicles; cranes; steam heat; mechanical systems; electrical systems; high pressure air and hydraulics; and confined spaces.

Appendix A. Key Facility Summary (cont'd)

FACILITY NAME	MISSION/ STATUS	HAZARD CLASSIFICATION/ AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPAL HAZARDS AND VULNERABILITIES
Site 300 Environmental Testing	Mission: High explosives safety and performance testing Status: Bldgs. 834 and 836 operational; Bldgs. 854 and 858, inactive	Facility Category: Explosive The 1984 SAR does not adequately describe the safety envelope and was not approved by DOE; revision submitted to DOE	Detonation during preparation for dynamic testing. Significant facility damage and possible serious injury or death to facility workers.	High explosives and high pressures.
Site 300 Chemical Processing Facility (Chemistry Area)	Mission: Energetic material and component processing Status: Operational	Facility Category: Explosive BIO submitted to DOE in June 1997 Due to uncertainty of future mission of the facility, DOE has not requested a SAR.	Detonation during mechanical pressing. Significant facility damage.	High explosives; industrial; and chemical.
Site 300 Mechanical Processing Facilities (Process Area)	Mission: Explosives test assembly preparation Status: Operational	Facility Category: Explosive BIO submitted to DOE in June 1997 Due to uncertainty of future mission of the facility, DOE has not requested a SAR.	Initiation during assembly results in up to six fatalities on site. Detonation during machining results in significant damage to work bays. Deflagration to detonation during burning results in major wild fires and injury to firefighters.	Potential for detonation while handling, pressing, machining, and assembling high explosives; general industrial hazards; chemical; and radiography.
Site 300 Firing Facilities	Mission: Hydrodynamic testing of high explosives Status: Operational	Facility Category: Explosive The 1986 SAR for the firing bunkers did not address safety. OAK approved a new SAR on 12/2/98.	Detonation during final setup of a shot or investigation of a misfire results in fatalities and serious injuries to people at the firing table.	Explosives; radiation; lasers; industrial; debris containing depleted uranium and beryllium.
Site 300 Materials Management Facilities	Mission: High explosives receiving, shipping, and storage Status: Operational	Facility Category: Explosive SAR has been submitted to DOE.	Detonation of the entire shipment results in up to five onsite fatalities and injury to ten collocated workers.	Storage of large amounts of high explosive; storage of depleted uranium and beryllium.

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